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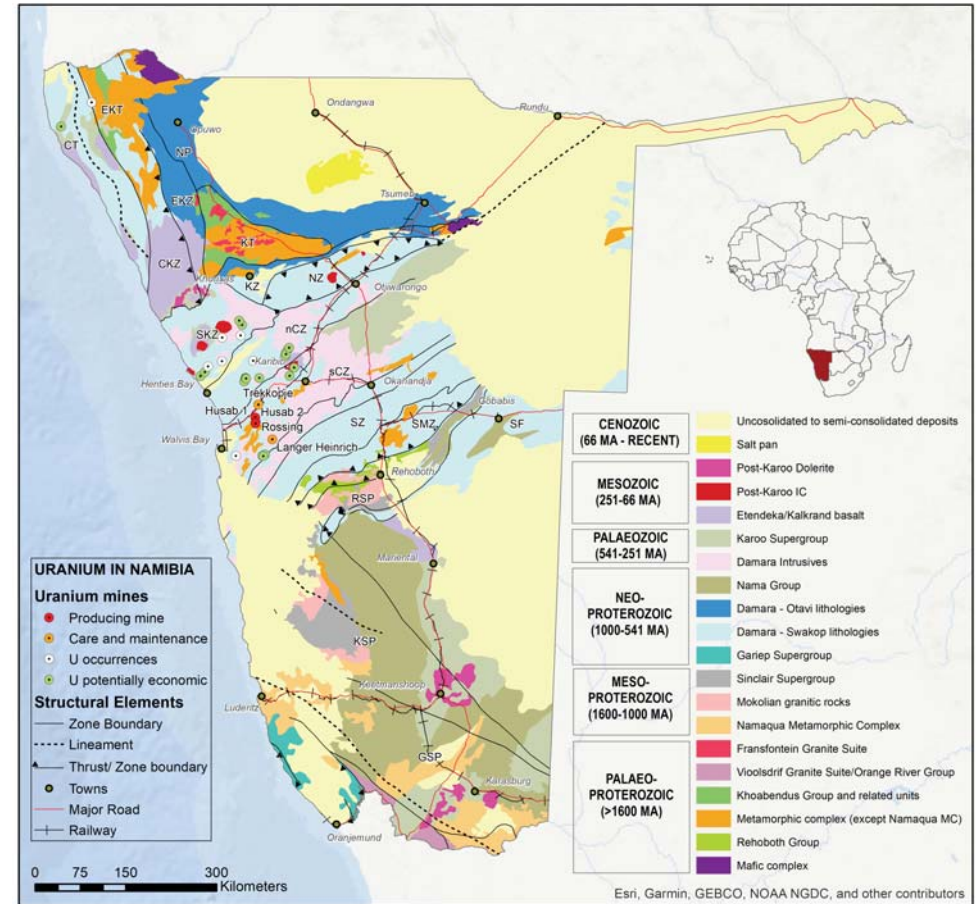


GEOLOGICAL SURVEY OF NAMIBIA



Commodity & Host Geology

Anomalous uranium occurs within the Damara belt with comparable few occurrences in the Namaqua Metamorphic province and Karoo Supergroup. The Damara uranium province is situated in the Erongo region between Usakos - Swakopmund and from south of Brandberg to north of Walvisbay. Both producing and potential mines are located in the Damara uranium province.



- The known uranium deposits have been grouped into three types:
- Rössing-type, associated with late-to post-orogenic granites;
 - Langer Heinrich-type, hosted in palaeochannels; and,
 - Unconformity-type related to the interface Damara – Karoo Supergroups.

Rössing-type (Granite hosted)

The world's largest open-pit uranium mine, Namibia's first uranium mine, Rössing Mine, started operations in 1976 and is producing up until today. The ore body is low-grade (300 ppm U3O8) leucogranite-hosted deposit. Uranium occurs mostly as uraninite (55%) and beta-uranophane (40%) in the form of interstitial grains and crystal inclusions in minerals; beta-fite makes up for the remaining 5%.

Langer Heinrich-type (Palaeochannel, Calcrete hosted)

Uranium mineralisation in Langer Heinrich type is mainly occurs in fluvial sediments of palaeochannels as carnotite. The mineralisation is associated with calcrete- and gypcrete-filled palaeochannels, which developed under arid climatic conditions. The main uranium mineral, carnotite, occurs in small patches and lenses around grains and pebbles, or finely disseminated.

The dry coastal belt of western Namibia has numerous calcrete-hosted uranium deposits.

Unconformity-type

The Engo Valley deposit in northwestern Namibia is a unconformity uranium mineralisation hosted in a fluvio-glacial fan deposit of Dwyka Formation and within the overlying shales of Ecca Formation of the Karoo Supergroup. The main uranium minerals are carnotite and uraninite. The deposit is located in the Engo River Valley and has a total reserve of 5.68 million t at a grade of 340 g/t uranium oxide calculated from two mineralised zones. This exclude reserves in the overlying shale that is mineralised over a large area but with a low grade of 120 ppm.

The base of the Nama Group is also a target for unconformity-type uranium in southern Namibia.

Resources and Reserves

Project	Status	Type	Reserves	Resources	Source of estimates
Anomaly No. 18	Exploration, reserves development			50 Mt @ 0.023 U3O8	estimate of 2013, S&P Global
Marenica	Prefeasibility, scoping			Measured & indicated 26 Mt @ 0.011 U3O8; inferred 272 Mt @ 0.009 U3O8	estimate of 2014 S&P Global
Rössing	Production	Granite hosted		72 Mt @ 0.039 U3O8	estimate of 2018 S&P Global
Norasa	Pre-production, projected start-up 2020, projected closure 2031	Granite hosted	206 Mt @ 0.02 U3O8	measured & indicated 59 Mt @ 0.019 U3O8; inferred 26 Mt @ 0.02 U3O8	estimate of 2015 S&P Global
Etango (Bannerm ann)	Feasibility, projected start-up 2020, projected closure 2035	Granite hosted	303 Mt @ 0.02 U3O8	measured & indicated 92 Mt @ 0.017 U3O8; inferred 263 Mt @ 0.019 U3O8	estimate of 2015 S&P Global

Husab (Taurus+G RN)	Production	Granite hosted	280 Mt @0.052 U3O8	measured & indicated 75 Mt @ 0.019 U3O8; inferred 227 Mt @ 0.031 U3O8	estimate of 2011 S&P Global
Omahola (Deep Yellow)	Prefeasibility, scoping	Granite hosted		measured & indicated 61 Mt @ 0.035 U3O8; inferred 160 Mt @ 0.031 U3O8	estimate of 2019 S&P Global
Trekkopje (Orano)	Pre-production, care and maintenance	Palaeo-channel		measured & indicated 60 Mt @ 0.014 % U3O8; inferred 114 Mt @ 0.013 % U3O8	estimate of 2017 S&P Global
Langer Heinrich	Prefeasibility, care and maintenance	Palaeo-channel	30 Mt @0.036 % U3O8	91 Mt @ 0.048 % U3O8	estimate of 2019 S&P Global

Production of Uranium (tonnes U), period 2008 -2018

Mine	Company	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rössing	CNUC	3449	3519	3083	2641	2289	2043	1308	1057	1569	1790	2102
Langer Heinrich	Paladin	919	1108	1419	1437	1960	2098	1947	1937	1893	1294	394
Husab	Swakop								0	192	1140	3028
Trekkopje	Orano	0	0	0	0	251	186	0	0	0	0	0
Total (tonnes U)					4078	4500	4327	3255	2994	3654	4224	5524

Source: World Uranium Association (updated August 2019)

Status of Projects and Mines

Currently, Rössing and Husab Mines are in operation while Trekkopje and Langer Heinrich mines are under care and maintenance. Several promising uranium projects are on the way to become future mines. A number of projects have been granted mining licenses and construction awaits capital investment and improved market conditions.

Langer Heinrich-type (Palaeochannel, Calcrete hosted)

Conventional plant processing for yellow cake is currently taking place at both Rössing and Husab Mines and had been the case for the now under care and maintenance Langer Heinrich mine.